

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 8, 9, 15, 17, 21 and 22, and cancel claims 6, 7, 13 and 14, as set forth in the listing of claims that follows:

Claim 1 (currently amended): A pack-bonded, multiphase composite material for use in a cell of a battery, comprising:

~~at least two~~ three layers of a matrix material pack-bonded with ~~at least one layer~~ two layers of a reinforcement material, such that a top layer, a bottom layer and a middle layer of said matrix material are provided, wherein said top layer and said bottom layer are a first matrix material of a first thickness and said middle layer is a second matrix material of a second thickness, the reinforcement material being ~~substantially~~ non-conductive, wherein fibers in said reinforcement material are oriented in a pack-bonded direction and wherein said matrix material and said reinforcement material are chemically dissimilar.

Claim 2 (previously presented): The pack-bonded material as in claim 1, wherein said reinforcement material is uniformly dispersed upon a surface of one of said matrix materials.

Claim 3 (original): The pack-bonded material as in claim 1, wherein said matrix material is selected from the group consisting of lead and lead alloys.

Claim 4 (cancelled)

Claim 5 (previously presented): The pack-bonded material as in claim 1, wherein said fibers are selected from the group consisting of nylon fibers, glass fibers, polymeric aramid fibers, aluminum oxide fibers, graphite fibers, alumina-type glass fibers, metallized fibers, polymeric fibers, and combinations thereof.

Claims 6-7 (cancelled):

Claim 8 (currently amended): The pack-bonded material as in claim 1 ~~7~~, wherein said first matrix material provides predetermined surface properties to the pack-bonded multiphase composite material.

Claim 9 (currently amended): A method of producing a composite material for a cell of a battery, comprising:

forming a stack of ~~at least two~~ three layers of a matrix material interleaved with ~~at least one layer~~ two layers of a ~~substantially~~ non-conductive reinforcement material, such that a top layer, a bottom layer and a middle layer of said matrix material are defined, wherein said top layer and said bottom layer are a first matrix material of a first thickness, and said middle layer is a second matrix material of a second thickness, wherein said matrix material and said reinforcement material are chemically dissimilar;

providing said stack to a pack-bonding process; and
pack-bonding said stack such that said reinforcement material is uniformly dispersed within said matrix material in a pack-bonding direction.

Claim 10 (original): The method according to claim 9, wherein said pack-bonding process comprises one or more cold-rolling processes.

Claim 11 (previously presented): The method according to claim 9, wherein said matrix material is selected from the group consisting of lead and lead alloys and said reinforcement material has a plurality of non-conductive fibers.

Claim 12 (original): The method according to claim 11, wherein said fibers are selected from the group consisting of nylon fibers, glass fibers, polymeric aramid fibers, aluminum oxide fibers, graphite fibers, alumina-type glass fibers, metallized fibers, polymeric fibers, and combinations thereof.

Claims 13-14 (cancelled)

Claim 15 (currently amended): The method according to claim 9 ~~14~~, wherein said first matrix material provides predetermined surface properties to the composite material.

Claim 16 (original): The method according to claim 9, wherein said stack forming step comprises:

interleaving a top continuous film of said matrix material, a first continuous film of said reinforcement material, a middle continuous film of said matrix material, a second continuous film of said reinforcement material, and a bottom continuous film of said matrix material.

Claim 17 (currently amended): A method of forming an expanded metal battery plate, comprising:

providing a stack comprising a top continuous film of said matrix material, a first continuous film of said reinforcement material, a middle continuous film of said matrix material, a second continuous film of said reinforcement material, and a bottom continuous film of said matrix material, interleaving at least two layers of a matrix material with at least one layer of a substantially nonconductive reinforcement material wherein said top continuous film and said bottom continuous film are a first matrix material of a first thickness, and said middle continuous film is a second matrix material of a second thickness, wherein said matrix material and said reinforcement material are chemically dissimilar;

pack-bonding said stack at least two layers of said matrix material and said at least one layer of said reinforcement material into a composite material, wherein said composite material includes said reinforcement material uniformly dispersed within said matrix material in a pack-bonding direction; and

expanding and cutting said composite material to form the expanded metal battery plate.

Claim 18 (original): The method according to claim 17, wherein said interleaving step comprises:

providing a top continuous film of said matrix material, a first continuous film of said reinforcement material, a middle continuous film of said matrix material, a second continuous film of said reinforcement material, and a bottom continuous film of said matrix material

Claim 19 (original): The method according to claim 18, wherein said first matrix material provides predetermined surface properties to the composite material.

Claim 20 (original): The method according to claim 17, wherein said pack-bonding step comprises one or more cold rolling processes.

Claim 21 (currently amended): A composite material for use in a cell of a battery, comprising:

first and second non-conductive layers of a substantially non-conductive reinforcement material layer comprising fibers; and,

first, and second and third conductive layers of electrically conductive material, arranged in a stack such that the first non-conductive layer is interleaved between the first and second conductive layers and the second non-conductive layer is interleaved between the second and third conductive layers, wherein the first and third conductive layers have a first thickness, and said second layer has a second thickness, the first layer being disposed on a first side of the reinforcement material layer, the second layer being disposed on a second side of the reinforcement material layer, wherein fibers in the reinforcement material layer are oriented in a predetermined direction by cold-rolling the first, and second and third conductive layers and the first and second non-conductive layers reinforcement material layer.

Claim 22 (currently amended): A method for producing a composite material for a cell of a battery, comprising:

stacking a first layer of a substantially non-conductive reinforcement material ~~layer~~ between first and second layers of electrically conductive material and a second layer of said non-conductive reinforcement material between said second layer and a third layer of said electrically conductive material, wherein the first and third layers of electrically conductive material has a first thickness and said second layer of said electrically conductive material has a second thickness; and,

cold-rolling the stack in a first direction wherein fibers in the reinforcement material layer are oriented substantially in the first direction.